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 DEPARTMENT: ELECTRICAL ENGINEERING

MAT 102 assignment

$$A = 2i - j \quad B = 3i + j - 11k \quad C = 4i + 4j - 5k$$

$$\textcircled{I} -3A + 7B - 8C$$

$$\Rightarrow -2A = -3(2i - j)$$

$$= -6i + 3j$$

$$7B = 7(3i + j - 11k)$$

$$= 21i + 7j - 77k$$

$$-8C = -8(4i + 4j - 5k)$$

$$= -32i - 32j + 40k$$

$$\Rightarrow -3A + 7B - 8C = (-6i + 3j) + (21i + 7j - 77k) - (-32i - 32j + 40k)$$

$$= (15i + 10j - 77k) - (-32i - 32j + 40k)$$

$$= (-17i - 22j - 37k)$$

$$\textcircled{II} K = 2A + 4B - C$$

$$\Rightarrow 2A = 2(2i - j)$$

$$= (4i - 2j)$$

$$4B = 4(3i + j - 11k)$$

$$= (12i + 4j - 44k)$$

$$2A + 4B - C = (4i - 2j) + (12i + 4j - 44k) - (4i + 4j - 5k)$$

$$= (16i + 2j - 44k) - (4i + 4j - 5k)$$

$$K = (12i - 2j - 39k)$$

$$\text{Magnitude of } K = \sqrt{12^2 + (-2)^2 + (-39)^2}$$

$$= \sqrt{1537}$$

$$= 39.2 \approx 39$$

$$\cos \alpha = \frac{12}{39}$$

$$\cos \beta = \frac{-2}{39}$$

$$\cos \phi = \frac{-39}{39}$$

$$\begin{aligned} &\Rightarrow (0-44)i + (0-132)j + (2+12)k \\ &= 14k \\ &\therefore (3A \times B) \cdot (A \times 2B) = 21k \times 14k = 294k \end{aligned}$$

1)  $A - 2B - C$

$$\begin{aligned} 2B &= 2(3i + j - 11k) = (6i + 2j - 22k) \\ &\Rightarrow (2i + j) - (6i + 2j - 22k) - (4i + 4j - 5k) \\ &= -8i - 5j - 27k \end{aligned}$$

2) Perpendicular vectors; two vectors are said to be perpendicular if  $A \cdot B = 0$  (the vectors) equal zero.

Co-planar vectors; vectors parallel to the same plane or to the same plane are called co-planar vectors.